

NOTES ON THE WOUNDED AT VERA CRUZ.

By H. F. STRINE, surgeon, United States Navy, and M. E. HIGGINS, passed assistant surgeon, United States Navy.

The *Solace* arrived at Vera Cruz at noon on April 22. The transfer of the wounded from the ships and shore stations began immediately. Fifty-five were received in all, the major portion during the first day. Twenty-nine of the cases were not of serious import. The following were of special interest:

Case 1.—N. P., O. S. Gunshot wound of skull. The bullet produced a scalp wound and grazed the skull on the right side of the parietal bone. Unconscious on admission with paralysis of left arm and leg. Operation showed depression of the inner table and a clot beneath the dura. Dura was opened and clot evacuated. Wound was drained down to dura and closed. No infection. On May 22 patient was up and about.

Case 2.—E. H. G., O. S. Gunshot wound of face. Entrance anterior to right ear. Exit left cheek. The facial artery was cut on the left side. The large lacerated wound of the cheek healed rapidly. Small fistula of right parotid gland remains.

Case 3.—J. G. P., Pvt. Gunshot wound of the chest. Three wounds over the left scapula and a wound in the left axilla. Hemoptysis and high temperature for four days. X-ray showed comminuted fracture of fourth rib and fragments of metal jacket and bone in the axilla. Several pieces of bone and metal jacket were removed. There was a mild infection of all wounds but temperature soon went to normal and patient convalesced rapidly.

Case 4.—H. P., F-1. Gunshot wound of chest and spine. Bullet entered the left chest at the sixth rib on mid-axillary line, passed downward, and severed the cord in the dorsolumbar region. Hemothorax and complete loss of sensation and motion in the lower extremities with loss of function of bladder and rectum. The pleural cavity was twice aspirated and 500 and 1,000 c. c. of fluid blood evacuated. Death occurred on the fourteenth day. When this patient was admitted there were signs of internal hemorrhage and marked abdominal rigidity. An exploratory laparotomy was performed, but there was no intestinal injury.

Case 5.—E. G. W., O. S. Gunshot wound of abdomen. Entrance in the hypogastrium. Exit right buttock. The spermatic cord was severed and the rectum perforated. There was a large amount of blood in the right side of the scrotum. Operation. The spermatic cord was tied and the right testicle removed. Both wounds suppurated and discharged feces. On May 23 patient was convalescing, but was still discharging some fecal matter from the posterior wound.

Case 6.—J. McM., Pvt. Gunshot wound of the abdomen. Entrance hypogastrium. Bullet passed downward through the scrotum and entered right thigh, lodging in the muscles. No infection. Bullet not removed.

Case 7.—C. F., civilian. Perforating wound of abdomen. Entrance near the anterior superior spine on right side. Exit right buttock. Some hemorrhage for two days. Mild infection at wound of entrance. No signs of intestinal or bone injury. Was sent to hospital ashore on May 5 for convalescence.

Case 8.—G. D., Pvt. Perforating wound of abdomen. Entrance 2 inches above the navel. Exit above the anterior superior spine of the ilium on the right side. No shock, hemorrhage, or signs of peritonitis. Complained of some "soreness" in right lower quadrant, but had no other symptoms.

Case 9.—F. N. C., Sea. Gunshot wound of abdomen. Bullet entered the abdomen above the symphysis pubis and passed out on the right buttock between the great trochanter and the spine of the ischium. No infection. Paralysis of the extensor muscles of the right foot. Injury to the sacral plexus.

Case 10.—W. O. K., C. T. C. Gunshot wound of arm. Bullet entered upper third of left arm anteriorly, struck the humerus with explosive effect, producing great comminution and destruction of soft tissues to the elbow. Amputation.

Case 11.—M. F., Sergt. Gunshot wound, right shoulder, perforating. Entrance anteriorly. Fracture of outer end of clavicle and margin of the glenoid cavity. No infection. Prognosis as to function good.

Case 12.—M. A., civilian. Gunshot wound of upper extremity. Deep gutter wound of posterior aspect of right elbow, opening the joint. Infected. Followed by severe cellulitis of forearm. Forearm incised and drained. Infection subsided and patient went ashore on the seventh day.

Case 13.—H. A. B., O. S. Gunshot wound of right wrist. Small perforating wound of right wrist. No infection and no impairment of function.

Case 14.—I. L. K., Sea. Gunshot wound of left arm and back. Both wounds were perforating, probably by the same bullet. They

healed without infection. He expectorated a little blood for two days. "Numbness" in fingers supplied by the median nerve. Fourteen days after the injury there was a profuse secondary hemorrhage from the wound of the arm. Hemorrhage controlled by pressure, but recurred with greater intensity on the following day. Operation showed the median nerve to be partially severed and a hole about 3 millimeters in diameter in the brachial artery. Artery was tied and nerve sutured. Hemorrhage evidently coincident with separation of slough caused by burn. Collateral circulation was promptly established and wound healed by primary union.

Case 15.—E. P. P., Pvt. Gunshot wound of back and right forearm. Wounds of back healed rapidly and without infection. The bullet perforating the forearm caused some splintering of the radius. Mild infection which soon subsided.

Case 16.—L. D. R., Sea. Gunshot wound of right shoulder. Bullet entered anteriorly, perforated the scapula and lodged beneath the skin. No injury to the structures about the joint and no infection.

Case 17.—H. N. N., B. M.-2. Gunshot wound of lower extremity. Perforating wound of left leg producing a compound fracture. On the third day patient was very septic, high temperature, rapid pulse and prostration. The subcutaneous tissues were emphysematous to a point slightly above the knee. The discharge from the wound was serosanguineous and had a very foul odor. Smear showed numerous Gram positive organisms with a centrally situated spore. Amputation at the junction of the upper and middle thirds of the thigh.

Case 18.—C. P. K., O. S. Gunshot wound of right leg. The right leg above the ankle was the seat of a compound fracture of both bones, with great laceration of soft parts. On the third day patient was septic. Examination showed an emphysematous condition of the subcutaneous tissues as high as the knee. The discharge from the wound was serosanguineous and had a peculiarly offensive odor. Temperature was high, pulse intermittent and rapid, 120-130. Amputation at middle of the thigh.

Case 19.—H. J. K., Sea. Perforating wound of right knee. Bullet entered above patella anteriorly and made its exit posteriorly, 3 inches below the knee. No infection. Prognosis as to function good.

Case 20.—C. R. H., Sea. Gunshot wound of right thigh. The bullet perforated both thighs, passing first through the muscles of the left then through the right, shattering the femur. Profuse hemorrhage arrested by pressure. Mild infection. External wound was enlarged sufficiently to insert drainage tubes. Did well until eighth day when there was a copious secondary hemorrhage. Hemorrhage arrested by pressure but recurred on the ninth day. Operation decided on to determine bleeding point. At operation large infil-



E. J. G. FLESH WOUND OF ARM, BULLET LYING ON HUMERUS.



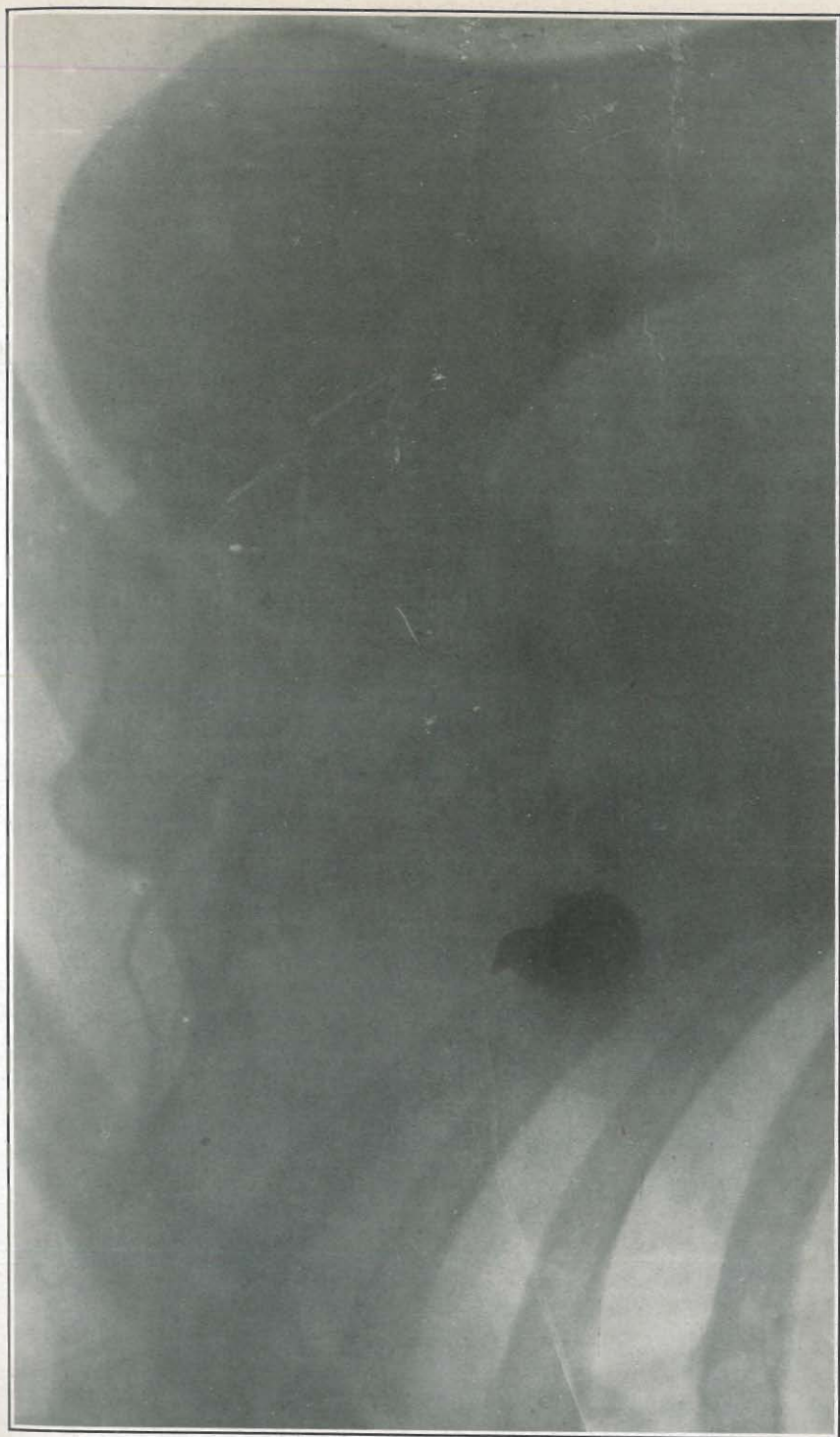
CASE 3.—G. J. P., PVT.



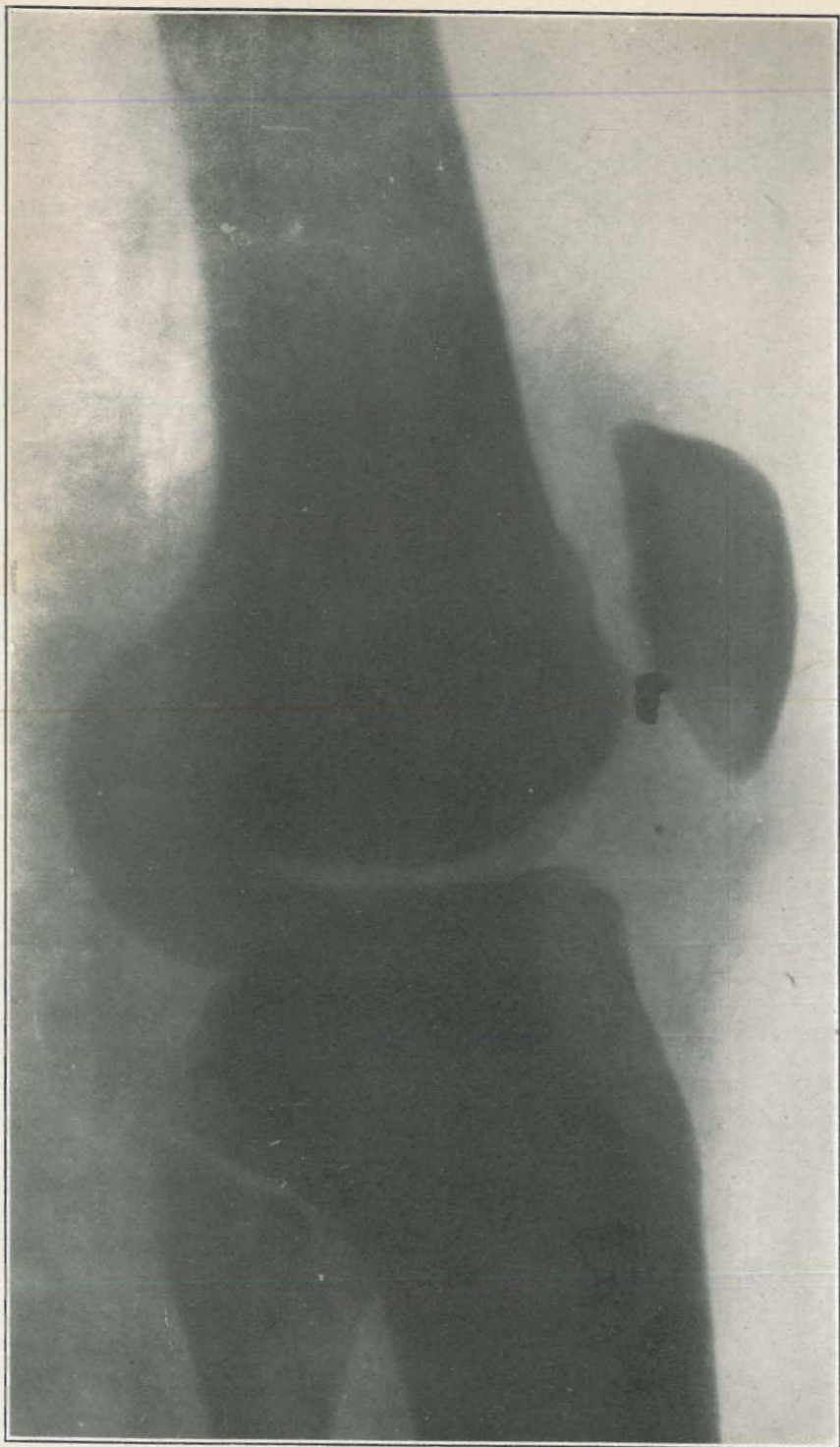
CASE 11.—N. F., SGT.



CASE 15.—E. P. P., PVT.



CASE 16.—L. D. R., SEA.



CASE 26.—F. J. P., O. S.

trating hematoma, extensive destruction of soft tissues by secondary bone missiles. Amputation. Died.

Case 21.—E. A. G., El.-3. Gunshot wound of left knee. Bullet struck lower end of femur with explosive effect, causing extensive fragmentation of bone and destruction of soft parts. Amputation at middle of thigh.

Case 22.—H. F., O. S. Gunshot wound of right knee. Perforating, anteroposterior. No infection.

Case 23.—G. H. C., O. S. Gunshot wound of lower extremity. Bullet perforated soft parts posterior to right knee, injuring the external popliteal nerve, causing paralysis of extensor muscles. No infection.

Case 24.—J. C., civilian. Gunshot wound of buttocks. The bullet passed laterally through both buttocks, producing four wounds, two of exit and two of entrance. All of these wounds healed without infection.

Case 25.—M. B., civilian. Gunshot wound of lower extremity. Entrance upper third left thigh anteriorly. The bullet struck the femur with explosive effect, driving bone fragments through the posterior aspect of the thigh. Copious hemorrhage. Infection. On the third day anterior wound was enlarged sufficiently to remove some of the bone fragments and insert large drainage tubes. Wound discharged freely and he did well until the eighth day, when a profuse secondary hemorrhage occurred. Hemorrhage recurred several times and patient died on the fourteenth day. The proximity to the hip, the extensive destruction of bone and soft tissues, the hemorrhage, and infection made this case practically hopeless.

Case 26.—F. P., O. S. Gunshot wound of left knee. Penetrating wound. X ray showed fragment of metal in peri-articular tissue near patella. Joint was not opened. Fragment was portion of steel jacket and was removed under local anesthesia. No infection.

COMMENTS.

Most of the wounds were caused by the Mauser type of steel-jacketed bullet. Many were at ranges considerably under 600 yards and the explosive effect on long bones at such a range was well illustrated in several cases.

The general character of the wounds conformed to the well-recognized effects of the modern high-power rifle. A number of wounds were caused by small fragments of the steel jackets of the bullets. As the fighting was largely in the street, it is supposed that bullets striking the hard pavements exploded, with the result that the fragments of the jacket became secondary missiles.

In many of the flesh wounds it was noted that either the wound of entrance or the wound of exit, or both, were ringed by an area of

greatly devitalized tissue. This usually sloughed off within 10 days and healing went on by granulation. This devitalization of tissue was particularly marked in long guttered wounds with laceration.

Three cases of late hemorrhage occurred; two in wounds of the thigh and one in a wound of the arm, the latter due to separation of the slough from a burn of the brachial artery.

There were three cases, as described above, of nerve injury.

The one wound of the skull coming under our observation bore out the well-known fact that without fracture, or, at most, a very slight injury to the outer table, extensive damage may result to the inner table or brain.

All observers agree that gunshot wounds of the spine are remarkably fatal, and the serious nature of such cases is augmented when there exist chest and abdominal injuries or hemorrhage.

Of the five cases of abdominal wounds, only two involved the peritoneum. Three cases had the wound of entrance in the hypogastric region and involved neither the bladder nor peritoneum.

Infection, except in the cases noted above, was mild in character. In the amputations infection of the stumps occurred. In two of these the bullet had entered above the line of amputation, necessitating incision through the track of the bullet. In the cases of gas infection, the extension of the ordinary pyogenic organisms by the lymphatics is a strong probability.

Eighteen, or 32 per cent of the cases, were wounds of the lower extremity, comprising two of the three fatal cases. Both of these were compound fractures of the thigh. In each case the bullet had struck the femur and produced extensive comminution, injuring soft parts and vessels by secondary missiles of bone. Certainly compound fractures of the thigh, associated as they frequently are with hemorrhage, infection, and the difficulties of transportation, will tax to the utmost the judgment and skill of the surgeon.

It is generally conceded that wounds of the chest do remarkably well, and the one serious case on the *Solace* bears out this opinion. On admission, the case appeared to be very grave, but went on to a rapid convalescence.

The knee joint was perforated in two cases. In neither was there infection, and impairment of function will probably not result.

TREATMENT.

When the cases were received on board the first-aid dressings were in nearly every instance admirably applied. These dressings were changed and all wounds examined. Wounds of exit and entrance were touched with tincture of iodine. The wounds of the knee were treated by occlusive dressings and fixation. The general management was along accepted lines of asepsis and antisepsis.

The location of wounds was as follows:

Head	6
Thorax	10
Abdomen	5
Upper extremity	16
Lower extremity	18
Total	55
